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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
VUONG, QUOCHIEN B	
ART UNIT	**PAPER NUMBER**
2618	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/707,744	SUGAR ET AL.	
	Examiner	Art Unit	
	Quochien B. Vuong	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 03/26/2004, 03/26/2004, 08/05/2005, 02/06/2006, and 09/18/2006 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

Specification

2. The disclosure is objected to because of the following informalities: paragraph [0001], after the phrase "10/065,388, filed October 11, 2002", need to add "**, now U.S. Patent No. 6,728,517**" to update the continuation data

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 6, 7 and 23-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Ling et al. (US 7,006,848).

Regarding claim 1, Ling et al. (figure 1; column 3, line 23 – column 6, line 24) disclose a multiple-input multiple-output (MIMO) radio transceiver on a single semiconductor integrated circuit (column 35, line 63 – column 36, line 3), comprising: a receiver comprising at least first and second receiver circuits each to process a signal from a corresponding one of first and second antennas, the first receiver circuit downconverts a first receive signal detected by the first antenna to produce a first baseband signal, the second receiver circuit downconverts a second receive signal detected by the second antenna to produce a second baseband signal (column 13, line 57 – column 14, line 7); and a transmitter comprising at least first and second transmitter circuits, the first transmitter circuit upconverts a first baseband transmit signal to generate a first radio frequency signal that is coupled to the first antenna for transmission, the second transmitter circuit upconverts a second baseband transmit signal to generate a second radio frequency signal that is coupled to the second antenna for transmission (figure 3; column 10, line 3 – column 11, line 33) (it is noted that the system 100 in figure 1 show the communication between first system 110 as a transmitter and a second system 150 as a receiver; however, both first and second systems are transceiver systems which can transmit and receive, for example the first system 110 has transmitter section including 112, 114, 120, and MOD 122a-122t, and receiver section including DEMOD 122a-122t and 132).

As to claims 6 and 7, Ling et al. disclose wherein the first and second receiver circuits comprise a single stage mixing process to downconvert the first and second receive signals directly to baseband or a two stage mixing process to downconvert the

first and second receive signals to first and second intermediate frequency signals at a common intermediate frequency, and then to first and second baseband signals (column 13, line 57 – column 14, line 7).

As to claim 23, Ling et al. disclose the MIMO transceiver of claim 1 above; in addition, Ling et al. disclose a system comprising a plurality of MIMO radio transceivers (transceivers 122a-122t), and further comprising a baseband signal processor (TX and RX processor) coupled to the plurality of MIMO radio transceivers (figure 1; column 13, line 57 – column 14, line 7).

As to claim 24, Ling et al. disclose wherein the baseband signal processor supplies the first and second baseband transmit signals to a first MIMO radio transceiver and supplies third and fourth baseband transmit signals to a second MIMO radio transceiver, and wherein the baseband signal processor processes the first and second baseband signals produced by the first MIMO radio transceiver and processes the third and fourth baseband signals produced by the second MIMO radio transceiver (figure 1; column 13, line 57 – column 14, line 7).

As to claim 25, Ling et al. disclose wherein the receivers of the second MIMO radio transceivers simultaneously receive signals detected at respective antennas coupled thereto to produce the first, second, third and fourth baseband signals, and wherein the transmitters of the first and second MIMO radio transceivers simultaneously process the first, second, third and fourth baseband transmit signals for simultaneous transmission of corresponding radio frequency signals by respective antennas coupled thereto (figure 1; column 13, line 57 – column 14, line 7).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2-5, 9, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling et al. in view of Matero (US 6,215,988).

Regarding claim 2, Ling et al. disclose the radio transceiver of claim 1 above. Ling et al. do not specifically disclose a local oscillator coupled to the receiver and to the transmitter, the local oscillator supplying a local oscillator signal to each of the first and second receiver circuits used for downconverting the first and second receive signals, respectively, and supplying a local oscillator signal to each of the first and second transmitter circuits used for upconverting the first and second baseband transmit signals, respectively, to a desired frequency for the first and second radio frequency signals, respectively. However, Matero (figure 3) disclose a local oscillator (52) coupled to the receiver and to the transmitter, the local oscillator supplying a local oscillator signal to each of the first and second receiver circuits used for downconverting the first and second receive signals, respectively, and supplying a local oscillator signal to each of the first and second transmitter circuits used for upconverting the first and second baseband transmit signals, respectively, to a desired frequency for the first and second radio frequency signals, respectively (column 4, lines 27 – 60). Therefore, it would have

been obvious for one having ordinary skill in the art at the time the invention was made to adapt the local oscillator of Matero to the transceiver of Ling et al. for compact design since using only a single local oscillator.

As to claim 3, Matero discloses wherein the first receiver circuit and the second receiver circuit process the first and second receive signals substantially simultaneously to allow for combining of signals resulting from processing by the first and second receiver circuits (column 4, lines 27 – 60).

As to claim 4, Matero discloses wherein the first transmitter circuit and the second transmitter circuit process the first and second baseband transmit signals for transmission of the corresponding first and second radio frequency signals substantially simultaneously (column 4, lines 27 – 60).

As to claim 5, Ling et al. disclose the radio transceiver of claim 1 above. Ling et al. do not specifically disclose a frequency synthesizer that produces a local oscillator signal that is coupled to each of the first and second receiver circuits to be mixed with the first and second receive signals, respectively, wherein the local oscillator signal may be at any frequency within one or more discrete radio frequency bands to receive the first and second receive signals at a common frequency, and wherein the frequency synthesizer generates a local oscillator signal that is coupled to the first and second transmitters to upmix the first and second baseband transmit signals, respectively, for transmission of the corresponding first and second radio frequency signals at a common frequency within the one or more radio frequency bands. However, Matero (figure 3) discloses a frequency synthesizer that produces a local oscillator signal that is coupled

to each of the first and second receiver circuits to be mixed with the first and second receive signals, respectively, wherein the local oscillator signal may be at any frequency within one or more discrete radio frequency bands to receive the first and second receive signals at a common frequency, and wherein the frequency synthesizer generates a local oscillator signal that is coupled to the first and second transmitters to upmix the first and second baseband transmit signals, respectively, for transmission of the corresponding first and second radio frequency signals at a common frequency within the one or more radio frequency bands (column 4, lines 27 – 60). Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to adapt the frequency synthesizer of Matero to the transceiver of Ling et al. for compact design since using only a single frequency synthesizer.

As to claim 9, Ling et al. disclose the radio transceiver of claim 1 above. Ling et al. do not specifically disclose a first power amplifier in the first transmitter circuit that amplifies the first radio frequency signal and a second power amplifier in the second transmitter circuit that amplifies the second radio frequency signal. However, Matero (figure 3) disclose a first power amplifier (66) in the first transmitter circuit that amplifies the first radio frequency signal and a second power amplifier (84) in the second transmitter circuit that amplifies the second radio frequency signal (column 4, lines 27 – 60). Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to adapt the power amplifiers of Matero to the transceiver of Ling et al. for amplifying the transmitted signals.

Regarding claim 26, Ling et al. disclose method for radio communication comprising steps of: coupling first and second radio frequency signals detected by first and second antennas to first and second receiver circuits on an integrated circuit; downconverting the first and second radio signals with the first and second receiver circuits to produce first and second baseband signals; coupling first and second baseband first and second transmitter circuits, integrated circuit; upconverting the first and second signals with the first and produce first and second transmit signals to respectively, on the baseband transmit second transmitter circuits to transmit radio frequency signals at a common center frequency; and coupling the first and second transmit radio frequency signals to the first and second antennas, respectively, for simultaneous transmission. Ling et al. do not disclose from downconverting and upconverting from a common center frequency. However, Matero (figure 3) disclose The first and second receivers downconverting and the first and second transmitters upconverting from a common center frequency (column 4, lines 27 – 60, the same local oscillator signal going to mixers 60, 74, and 78). Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to adapt the teaching of Matero to the transceiver of Ling et al. for compact design since using only a single local oscillator signal.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ling et al. in view of Hasler et al. (US 5,606,736).

Regarding claim 8, Ling et al. disclose the radio transceiver of claim 7 above. Ling et al. do not specifically disclose a frequency synthesizer that supplies a radio frequency local oscillator signal and an intermediate frequency local oscillator signal to the first and second receiver circuits, wherein the intermediate frequency local oscillator signal is derived from the radio frequency local oscillator signal by a division ratio. However, Hasler et al. (figures 1 and 2) disclose a frequency synthesizer that supplies a radio frequency local oscillator signal and an intermediate frequency local oscillator signal to the first and second receiver circuits, wherein the intermediate frequency local oscillator signal is derived from the radio frequency local oscillator signal by a division ratio (column 2, line 58 – column 3, line 15). Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to adapt the frequency synthesizer of Hasler et al. to the transceiver of Ling et al. for compact design since using only a single frequency synthesizer.

8. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ling et al. in view of Yamaguchi et al. (US 5,966,666).

Regarding claim 10, Ling et al. disclose the radio transceiver of claim 1 above. Ling et al. do not specifically disclose wherein each of the first and second receiver circuits comprises a radio frequency mixer that down-mixes the first and second receive signals, respectively, to an intermediate frequency signal, and a pair of quad mixers that down-mix the intermediate frequency signal to in-phase and quadrature baseband signals. However, Yamaguchi et al. (figure 1) disclose each of the first and second

receiver circuits comprises a radio frequency mixer (21, 22) that down-mixes the first and second receive signals, respectively, to an intermediate frequency signal, and a pair of quad mixers (27) that down-mix the intermediate frequency signal to in-phase and quadrature baseband signals (column 2, line 54 – column 3, line 50). Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to adapt the mixers of Yamaguchi to the transceiver of Ling et al. for processing the received signals.

Double Patenting

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 1-26 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 5, 6, 8-10, 15, 16, 27, 36-44, and 65 of

U.S. Patent No. 6,728,517. Although the conflicting claims are not identical, they are not patentably distinct from each other because:

Regarding claims 1 and 26 of the present application, claim 6 or 27 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including a multiple-input multiple-output (MIMO) radio transceiver on a single semiconductor integrated circuit, comprising: a receiver comprising at least first and second receiver circuits each to process a signal from a corresponding one of first and second antennas, the first receiver circuit downconverts a first receive signal detected by the first antenna to produce a first baseband signal, the second receiver circuit downconverts a second receive signal detected by the second antenna to produce a second baseband signal; and a transmitter comprising at least first and second transmitter circuits, the first transmitter circuit upconverts a first baseband transmit signal to generate a first radio frequency signal that is coupled to the first antenna for transmission, the second transmitter circuit upconverts a second baseband transmit signal to generate a second radio frequency signal that is coupled to the second antenna for transmission.

As to claim 2 of the present application, claims 5 and 6 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including a local oscillator coupled to the receiver and to the transmitter, the local oscillator supplying a local oscillator signal to each of the first and second receiver circuits used for downconverting the first and second receive signals, respectively, and supplying a local oscillator signal to each of the first and second transmitter circuits used for upconverting the first and second

baseband transmit signals, respectively, to a desired frequency for the first and second radio frequency signals, respectively.

As to claim 3 of the present application, claims 5 and 6 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including wherein the first receiver circuit and the second receiver circuit process the first and second receive signals substantially simultaneously to allow for combining of signals resulting from processing by the first and second receiver circuits.

As to claim 4 of the present application, claims 5 and 6 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including wherein the first transmitter circuit and the second transmitter circuit process the first and second baseband transmit signals for transmission of the corresponding first and second radio frequency signals substantially simultaneously.

As to claim 5 of the present application, claims 5 and 6 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including a frequency synthesizer that produces a local oscillator signal that is coupled to each of the first and second receiver circuits to be mixed with the first and second receive signals, respectively, wherein the local oscillator signal may be at any frequency within one or more discrete radio frequency bands to receive the first and second receive signals at a common frequency, and wherein the frequency synthesizer generates a local oscillator signal that is coupled to the first and second transmitters to upmix the first and second baseband transmit signals, respectively, for transmission of the corresponding first and

second radio frequency signals at a common frequency within the one or more radio frequency bands.

As to claim 6 of the present application, claims 5, 6, and 8 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including wherein the first and second receiver circuits comprise a single stage mixing process to downconvert the first and second receive signals directly to baseband.

As to claim 7 of the present application, claims 6 and 9 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including wherein the first and second receiver circuits comprise a two stage mixing process to downconvert the first and second receive signals to first and second intermediate frequency signals at a common intermediate frequency, and then to first and second baseband signals.

As to claim 8 of the present application, claims 6 and 10 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including a frequency synthesizer that supplies a radio frequency local oscillator signal and an intermediate frequency local oscillator signal to the first and second receiver circuits, wherein the intermediate frequency local oscillator signal is derived from the radio frequency local oscillator signal by a division ratio.

As to claim 9 of the present application, claim 6 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including a first power amplifier in the first transmitter circuit that amplifies the first radio frequency signal and a second power amplifier in the second transmitter circuit that amplifies the second radio frequency signal.

As to claim 10 of the present application, claims 16 and 27 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including wherein each of the first and second receiver circuits comprises a radio frequency mixer that down-mixes the first and second receive signals, respectively, to an intermediate frequency signal, and a pair of quad mixers that down-mix the intermediate frequency signal to in-phase and quadrature baseband signals.

As to claim 11 of the present application, claim 65 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including first and second lowpass filters, the first lowpass filter having inputs and an output and being shared by the first transmitter circuit and first receiver circuit, to filter either the first baseband transmit signal that is output to the first transmitter circuit or to filter the first baseband signal produced by the first receiver circuit, and the second lowpass filter having inputs and an out\-put and being shared by the second transmitter circuit and second receiver circuit to filter either the second baseband transmit signal that is output to the second transmitter circuit or to filter the second baseband signal produced by the second receiver circuit, and further comprising a first switch having an output coupled to an input of the first lowpass filter and that couples to the input of the first lowpass filter either the first baseband transmit signal or the first baseband signal, and a second switch having an output coupled to an input of the second lowpass filter and that couples to the input of the second lowpass filter either the second baseband trans\-mit signal or the second baseband signal.

As to claim 12 of the present application, claims 15 and 27 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including wherein the first receiver

circuit comprises first and second radio frequency mixers, wherein the first radio frequency mixer down-mixes the first receive signal to an intermediate frequency signal when the first receive signal is in a first radio frequency band and the second radio frequency mixer down-mixes the first receive signal to an intermediate frequency signal when the first receive signal is in a second radio frequency band, and wherein the second receiver circuit comprises first and second radio frequency mixers, wherein the first radio frequency mixer down-mixes the second receive signal to an intermediate frequency signal when the second receive signal is in a first radio frequency band and the second radio frequency mixer down-mixes the second receive signal to an intermediate frequency signal when the second receive signal is in the second radio frequency band.

As to claim 13 of the present application, claims 16 and 27 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including wherein the first receiver circuit further comprises a pair of quad mixers coupled to the output of the first and second radio fre\-quency mixers to further down-mix the intermediate frequency signal to the first in-phase and quadrature baseband signals representative of the first receive sig\-nal, and the second receiver circuit further comprises a pair of quad mixers coupled to the output of the first and second radio frequency mixers to further down-mix the intermediate frequency signal to the second in-phase and quadrature baseband signals representative of the second receive signal.

As to claim 14 of the present application, claims 27 and 36 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including in combination, the radio

transceiver of claim 1, and a radio front-end section comprising: a first transmit/receive switch to be coupled to the first antenna and a second transmit/receive switch to be coupled to the second antenna, wherein the first and second transmit/receive switches each comprise an antenna terminal to be coupled to the first and second antenna, respectively, a receive output terminal and a transmit input terminal, the transmit input terminals of the first and second transmit/receive switches being coupled to the output of the first and second transmitter circuits, respectively, wherein the first and second transmit/receive switches are responsive to a control signal to select one of the two output terminals; and b. first and second bandpass filters, the first bandpass filter coupled to the receive output terminal of the first transmit/receive switch and the second bandpass filter coupled to the receive output terminal of the second transmit/receive switch, the first and second bandpass filters filter the signals detected by the first and second antennas, respectively, to produce the first and second receive signals.

As to claim 15 of the present application, claims 27 and 37 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including wherein the first and second bandpass filters are dedicated to filtering signals in a first radio frequency band, and further comprising: a. third and fourth bandpass filters dedicated to filtering signals in a second radio frequency band; b. first and second band select switches, the first and second band selection switches having an input terminal coupled to the receive output terminals of the first and second transmit/receive switches, respectively, and each having a first output terminal coupled to the first and second bandpass filters,

respectively, and a second out\-put terminal coupled to the third and fourth bandpass filters, respectively.

As to claim 16 of the present application, claims 27 and 38 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including wherein the radio front-end section further comprises third and fourth band select switches, each having terminals, and an output terminal, first and second input the output terminal of the third and fourth band select switches being coupled to the transmit input terminals of the first and second transmit/receive switches.

As to claim 17 of the present application, claims 27 and 39 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including wherein the radio front-end section further comprises first and second lowpass filters dedicated to filtering signals to be transmitted in the first radio frequency band, the outputs of first and second lowpass filters input terminals of the third and fourth band select switches, respectively, and third and fourth lowpass filters dedicated to filtering signals to be transmitted in the second radio frequency band, the outputs of the third and fourth lowpass filters being connected to the second input terminals of the third and fourth band select switches.

As to claim 18 of the present application, claims 27 and 40 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including in combination, the radio transceiver of claim 1, and a radio front-end section, wherein the radio front end section comprises a first diplexer to be coupled to the first antenna and a second diplexer to be coupled to the second antenna, wherein the first and second diplexers each have first and second branches onto which signals from first and second radio frequency bands,

respectively, are coupled for transmission via the first and second antennas, respectively, or are coupled when received by the first and second antennas, respectively.

As to claim 19 of the present application, claims 27 and 41 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including wherein for each diplexer, the radio front-end section further comprises a bandpass filter coupled in the first branch to filter signals received in the first frequency band and a bandpass filter coupled in the second branch to filter signals received in the second frequency band.

As to claim 20 of the present application, claims 27 and 42 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including wherein the radio-front end section further comprises a transmit/receive switch coupled to the bandpass filter in each of the first and second branches for each diplexer, wherein the transmit/receive switch selects either a signal to be transmitted through an antenna coupled to the associated diplexer, or a signal detected by an antenna coupled to the associated diplexer which is coupled to the bandpass filter for that branch.

As to claim 21 of the present application, claims 27 and 43 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including wherein the radio transceiver further comprises a transmit/receive switch coupled to the bandpass filter in each of the first and second antenna, wherein the first and second diplexers each have first and second branches onto which signals from first and second radio frequency bands, respectively, are coupled for transmission via the first and second antennas,

respectively, or are coupled when received by the first and second antennas, respectively.

As to claim 22 of the present application, claims 27 and 44 of U.S. Patent No. 6,728,517 encompasses all the claimed limitations including wherein the radio front-end section further comprises a quarter wavelength element coupled between the transmit/receive switch and the bandpass filter in each of the first and second branches for each diplexer.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quochien B. Vuong whose telephone number is (571) 272-7902. The examiner can normally be reached on M-F 9:30-18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on (571) 272-7882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

QUOCHIEN B. VUONG
PRIMARY EXAMINER

Quochien B. Vuong
June 23, 2007.